Business Analytics with Python/R/ Tableau/Alteryx
Fall 2023.

INSTRUCTOR: Dr. Peter Y. Wui
E-mail: wuiy@uapb.edu
OFFICE HOURS: M,TH, F 5:00-7:00 PM
Class HOURS: Thursday 6:pm Business #226. Hybrid Class
TEXT:
1. Machine Learing with Python and Scikit-learn, by Sebastian Raschka, Yuxi Liu, Vahid Mirjalili.
2. Business Analytics, by Jeffrey D. Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann, 5th ed.
3. Modern Business Analytics, By Matt Taddy and Leslie Hendrix and Matthew Harding, 2023
4. Supplementary copied materials

TEXT WEBSITE: https://subscription.packtpub.com/book/data/9781801819312

Course Description
Course Description: This course provides an in-depth study of business analytics with a focus on machine learning and artificial intelligence. Students will learn how to use popular software tools such as Python, TensorFlow, Tableau and Alteryx to perform data analysis, visualization, and modeling. Students will also learn how to use machine learning and artificial intelligence techniques to solve business problems, including classification, regression, clustering, and natural language processing.

Course Goals:

- Basic concepts and methods of artificial intelligence –focus on **machine learning and Deep learning**

-Theory and application of machine learning using **Python (or using R)** language, Tableau and Alteryx.

-    Introduction to Python and Statistics, Tableau and Alteryx
-    Basic theories of machine learning: Linear Algebra: vectors, spaces, and matrices
-    How to prepare data sets
-    How to implement machine learning using python language: Scikit-learn library
-    How to analyze the results and make interpretations

Course Outline

Lecture1: Introduction to Business Analytics and Machine Learning.
- Overview of the course
- Introduction to business analytics and machine learning
- Types of machine learning algorithm

Lecture 2: Introduction to Python (or R)
- Basic coding and structure

Lecture 3: Introduction to Statistics and Data Visualization
- Descriptive Statistics
- Data analysis and visualization using python I(or R) and Tableau
- Data cleaning and feature engineering using Alteryx and Python (or R).

Lecture 4: Regression Analysis and Forecasting using python I(or R) and Alteryx.
- Linear and logistic regression models
- Time series analysis and forecasting
- Evaluation metrics for regression models

Lecture 5: Classification and Prediction
- Decision trees and random forests
- Support vector machines (SVM)
- Neural networks and deep learning

Lecture 6: Clustering and Dimensionality Reduction
- K-means clustering and hierarchical clustering
- Principal Component Analysis (PCA)
- t-SNE for visualization

Lecture 7: Natural Language Processing
- Text preprocessing and tokenization
- Sentiment analysis and opinion mining
- Named entity recognition and topic modeling

Lecture 8: Reinforcement Learning and Optimization
- Introduction to reinforcement learning
- Markov decision processes (MDP)
- Monte Carlo and Q-learning

Lecture 9: Business Analytics Case Studies
- Business use cases for machine learning and artificial intelligence
- Case studies in marketing, finance, and operations
- Ethical considerations and challenges in business analytics

Lecture 10: Deep Learning for Business
- Convolutional neural networks (CNN)
- Recurrent neural networks (RNN)
- Transfer learning and fine-tuning

Lecture 11: Conclusion and Future Directions

- Emerging trends in business analytics and machine learning
- Review of the course
- Opportunities and challenges for businesses in the age of AI.

Prerequisite:
Introductory Statistics and Algebra.

Course Evaluation and Grades:
Final course grades will be determined as follows:

Exams	400	A: 90-100%
Assignments	500	B: 80-89.9%
Group Project	100	C: 70-79.9%
Bonus Participations/Quiz	$+\alpha$	D:60-69.9%
Total	$1000+\alpha$	F: 59.9% or below

Course Activities:
Exam: There will be two exams. Students who need extra time or special testing procedures due to a disability or language barrier must make prior arrangements with the instructor.

Homework : There will be 5 homework assignments. The assignment should be turned in at the class. Students are expected to turn assignments in on time. Assignments turned in late may be accessed a late penalty of **20%** per day. Assignments will not be accepted after 5 days past the due date. Please make every effort to turn assignments in on time to avoid unnecessary late penalties.

Participation/Quiz: Actively engaging in class is an essential part of your learning process. There are 3 points per class to encourage your class participation. Your grades for this part will be determined on the basis of your class attendance rate and your contribution to class discussion. Throughout the semester, I may give unannounced quiz in class at the first or last 10 minutes.

Student Conduct:
Cheating or other student misconduct will not be tolerated in this class. Violations will be subject to disciplinary actions as specified in the University of Autonomous Madrid student handbook. College regulations against academic dishonesty (cheating, plagiarism) will be strictly enforced. Also, class members are expected to treat one another with courtesy and respect. **All devices (e.g., cell phones, beepers, and headsets, etc) that can disrupt the class should be deactivated during the class**. Taping of class lectures and discussion is allowed for students study purpose only.

Positive Learning Environment
I will do my best to ensure that this class will be a safe, positive, and supportive and meaningful learning experience. However, I need each student to be respectful and courteous at all times.

The following list includes, but is not limited to, the behaviors that will not be tolerated during class:

1. Vulgar language
2. Texting, Twittering, Facebooking, (or other social networking), etc.
3. Talking on the phone (please make sure your phones are on silent/vibrate before entering the class)
4. Bullying, making fun of, or harassing other students

If a student is in violation of any of the aforementioned items, he or she will be asked to leave the classroom.

Student with Disabilities:
Please notify me of any learning or physical disability, or special needs, which may affect your performance in this class. Arrangements will be made to provide you with the appropriate accommodation.